

AMENDMENTS TO THE CLAIMS

The following Listing of Claims, with amendments to independent claims 1, 13, 25, and 33 will replace all prior versions, and listings, of claims in the application. Note that claims 9, 10, 21 and 30 were previously cancelled. ***No new matter is introduced as a result of the following claim amendments.***

Claim 1 (Currently Amended). A text document capture method for digitizing a text document segment in printed form, ~~comprising~~ consisting of:

imparting a continuous lateral jittering between a digital imaging device and the text document;

obtaining multiple laterally-displaced digital images of all of the text document segment during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained directly from the lateral displacement of each digital image;

forming from the multiple laterally displaced images enhanced resolution image pixels of an enhanced resolution representation of the text document as a direct function of the fractional pixel offset positions;

said direct function providing a weighted combination of the image values of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions; and

de-blurring the enhanced resolution representation of the text document by thresholding the enhanced resolution representation into either one of two pixel luminance levels, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document.

Claim 2 (Original). The method of claim 1 in which the lateral jittering between the digital imaging device and the text document is imparted in a pair of transverse directions.

Claim 3 (Original). The method of claim 2 in which the transverse directions are generally perpendicular to each other.

Claim 4 (Original). The method of claim 2 in which the lateral jittering is imparted simultaneously in the pair of transverse directions.

Claim 5 (Original). The method of claim 1 in which the lateral jittering is cyclic.

Claim 6 (Original). The method of claim 1 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and the jittering moves the digital imaging device by about the pixel dimensions.

Claim 7 (Original). The method of claim 1 in which the text document segment is substantially all of the text document.

Claim 8 (Original). The method of claim 1 in which the forming the enhanced resolution representation of the text document includes calculating weighted sums from the multiple laterally displaced images.

Claims 9-10 (Cancelled).

Claim 11 (Previously Presented). The method of claim 1 in which de-blurring the enhanced resolution representation of the text document further includes applying a blur filter to the enhanced resolution representation.

Claim 12 (Original). The method of claim 11 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 13 (Currently Amended). A text document capture system for digitizing with a digital imaging device a segment of a text document in printed form, ~~comprising~~ consisting of:

a jittering mechanism for imparting a continuous lateral jittering between the text document and the digital imaging device while it obtains multiple laterally-displaced digital images of all of the text document segment, said lateral jittering moving through a distance being on the order of around one pixel;

a pixel offset determination system for determining fractional pixel offset positions at which each digital image was obtained directly from the lateral displacement of each digital image; ~~and~~

a processing system for forming enhanced resolution image pixels of an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a direct function of the pixel offset positions corresponding to each digital image, and for de-blurring the enhanced resolution representation; and

wherein the enhanced resolution image pixels are computed from a weighted combination of the image values of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset positions.

Claim 14 (Original). The system of claim 13 in which the jittering mechanism includes oscillators with transverse orientations for imparting cyclic lateral jittering in transverse directions between the text document and the digital imaging device.

Claim 15 (Original). The system of claim 14 in which the oscillators include piezo-electric oscillators.

Claim 16 (Original). The system of claim 13 in which the jittering mechanism imparts lateral jittering on the digital imaging device.

Claim 17 (Original). The system of claim 13 in which in which the digital imaging device includes an array of optical detectors corresponding pixels and having pixel dimensions

and the jittering mechanism moves the digital imaging device by about the pixel dimensions.

Claim 18 (Original). The system of claim 13 in which the text document segment is substantially all of the text document.

Claim 19 (Original). The system of claim 13 in which the processing system includes a computer that executes software instructions to form the enhanced resolution representation of the text document segment and to de-blur the enhanced resolution representation.

Claim 20 (Previously Presented). The system of claim 13 in which de-blurring the enhanced resolution representation of the text document includes conforming the enhanced resolution representation to only two image levels as a function of first and second thresholds.

Claim 21 (Cancelled).

Claim 22 (Original). The system of claim 20 in which de-blurring the enhanced resolution representation of the text document includes applying a blur filter to the enhanced resolution representation.

Claim 23 (Original). The system of claim 22 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 24 (Original). The system of claim 13 further comprising a jitter calibration target of which a digital image is obtained by the digital imaging device for calibrating the extent of jittering imparted by the jittering mechanism.

Claim 25 (Currently Amended). In a computer-readable medium, text document capture software for digitizing with a digital imaging device a text document segment in printed form, ~~comprising~~ consisting of:

- software for imparting controlled continuous lateral jittering between the text document and the digital imaging device;

- software for obtaining multiple laterally-displaced digital images of all of the text document segment at a plurality of non-predetermined fractional pixel offsets relative to an original position of the text document relative to the digital imaging device;

- software for determining the fractional pixel offsets of each digital image;

- software for forming enhanced resolution image pixels of an enhanced resolution representation of the text document segment from the multiple laterally displaced images as a direct function of the fractional pixel offsets;

- said direct function providing a weighted combination of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offsets; and

- software for de-blurring the enhanced resolution representation.

Claim 26 (Original). The medium of claim 25 in which the lateral jittering between the digital imaging device and the text document is imparted in a pair of transverse directions.

Claim 27 (Original). The medium of claim 25 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and the jittering moves the digital imaging device by about the pixel dimensions.

Claim 28 (Original). The medium of claim 25 in which the software for forming the enhanced resolution representation of the text document includes software for calculating weighted sums from the multiple laterally displaced images.

Claim 29 (Original). The medium of claim 25 in which the software for de-blurring the enhanced resolution representation of the text document includes software for conforming the enhanced resolution representation to only two image levels.

Claim 30 (Cancelled).

Claim 31 (Original). The medium of claim 29 in which the software for de-blurring the enhanced resolution representation of the text document includes software for applying a blur filter to the enhanced resolution representation.

Claim 32 (Original). The medium of claim 31 in which the digital imaging device includes an array of optical detectors corresponding to pixels and having pixel dimensions and in which the blur filter has a filter dimension corresponding to one of the pixel dimensions.

Claim 33 (Previously Presented). An image capture method for digitizing a spatially piecewise constant image, ~~comprising~~ consisting of:

imparting a continuous lateral jittering between a digital imaging device and the spatially piecewise constant image;

obtaining multiple laterally-displaced digital images of all of the spatially piecewise constant image during the continuous later jittering;

computing a fractional pixel offset distance representing a pixel capture position for each digital image directly from the lateral displacement of each digital image;

forming from the multiple laterally displaced images enhanced resolution image pixels of an enhanced resolution representation of the spatially piecewise constant image as a direct function of the computed fractional pixel offset distances;

said direct function providing a weighted combination of a plurality of multiple image pixel samples, derived from the multiple laterally-displaced digital images, which are determined to be nearest each enhanced resolution image pixel using the fractional pixel offset distances; and

de-blurring the enhanced resolution representation of the spatially piecewise constant image.